



Summary Report

National Symposium on Innovations in Geospatial Technology for Sustainable Development with special emphasis on NER

November 20-22, 2019



Organised jointly by

Indian Society of Geomatics (ISG) & Indian Society of Remote sensing (ISRS)

Hosted jointly by

ISG-Shillong Chapter, ISRS-Shillong Chapter

North Eastern Space Applications Centre & North Eastern Hill University



The National Symposium on “Innovations in Geospatial Technology for Sustainable Development with special emphasis on NER” and annual conventions of Indian Society of Geomatics (ISG) & Indian Society of Remote Sensing (ISRS) was organized jointly by Indian Society of Geomatics & Indian Society of Remote Sensing during 20-22 November in Shillong. The event was hosted by Indian Society of Geomatics, Shillong Chapter (ISG-SC) Indian Society of Remote Sensing, Shillong Chapter (ISRS-SC) North Eastern Space Applications Centre (NESAC), Umiam North Eastern Hill University (NEHU), Shillong. The Symposium focused on recent advancements made in the satellite payloads, data processing techniques, Web GIS, Mobile App., Geospatial Technology and applications in various key areas defined under different key programmes of the Government of India. The Symposium was attended by large number of researchers, professionals, academia, students and geospatial industry from different part of the country. More than 350 delegates from representing various states and on various themes has attended the symposium and participated in the deliberations.

The symposium was preceded by 2 days pre-symposium tutorials which were conducted during November, 18-19, 2019 under the four broad themes, 1) UAV Remote Sensing– Acquisition, processing and derivatives, 2) SAR data Processing and Applications, 3) Artificial Intelligence (AI) and Machine Learning (ML) for Remote Sensing Data Analysis, and 4) Hyperspectral Remote Sensing. A Session-wise summary of the national symposium are highlighted below:

Inaugural Session

The symposium was started with a invocation and traditional lighting of lamps. Shri PLN Raju, Director, NESAC and the Chairman of the Symposium Organising Committee, welcomed Hon'ble Governor of Meghalaya, the Chief Guest of the Inaugural Programme, Prof. S.K. Shrivastava, Vice Chancellor, North Eastern Hill University (NEHU), the Guest of Honour, Shri Tapan Mishra, President of ISG and ISRS and all other delegates coming from different parts of the country to the Symposium.



Shri Tathagata Roy, Hon'ble Governor of Meghalaya lighting the lamp

Shri Tapan Mishra in his presidential address gave the details of the activities of the ISG and ISRS in the country and various initiatives to expand the activities of the societies. Prof. S.K. Shrivastava, Vice Chancellor, NEHU, thanked Indian Society of Geomatics for choosing NEHU as the Venue of the symposium.

The national symposium was formally inaugurated by Shri Tathagata Roy, Hon'ble Governor of Meghalaya. In his inaugural address, the Governor stressed upon the innovations of space technology and geospatial technologies as a means to address issues and challenges of the north-eastern region and to enable it for accelerated development. Referring to the Prime Minister's recent appeal on the various ministries, agencies and state governments to use space technology, he stated that use of technology in this region assume significance in view of the challenges in terms of geographical isolation, difficult terrain, communication bottlenecks etc. He urged upon the scientists participating the symposium to give more focus to the aspects related to governance and development. Moreover, the governor cited the problem of traffic congestion in and around Shillong city and requested the geospatial communities to find the ways and means to solve these problems. The Abstract Volume cum Souvenir of the symposium was inaugurated by Hon'ble Governor during the inaugural function of the symposium.



Abstract Volume cum Souvenir of the symposium was released by Hon'ble Governor and other dignitaries on the dais.



A section of the delegates in the inaugural function.

This was followed by the award distribution ceremony of ISG and ISRS. ISG Award Ceremony was moderated by Shri Shasikant A. Sharma, Secretary, ISG and ISRS Award Ceremony was moderated by Dr Sameer Saran, Secretary, ISRS.



Governor, Meghalaya distributing Annual ISG and ISRS Awards

Plenary Session – I : *Geospatial Technology : Need for Innovation*

The session commenced with a talk by Dr. YVN Krishna Murthy, Registrar, IIST, Thiruvananthapuram on “Geospatial Technology for Good Governance and National Development” emphasizing the importance of GIS in areas like food production, water resource management, sustainable development, disaster risk reduction and governance along with big data analytics for nation building.



Prof. J Adinarayana from IIT Mumbai presented a talk on “*Disruptive Innovation in Precision Agriculture*” which explored the shift of agricultural methods from conventional to data driven using SMART technologies in farming built upon IoT (Internet of Things) and AI (Artificial Intelligence) techniques which have made possible real time, precision agriculture

Shri PLN Raju, Director, NESAC, spoke about “*Recent Advances In UAV Remote Sensing*” highlighting the use of UAVs in areas like landslide and land use mapping, embankment monitoring, community reserve forest mapping, post flood damage assessment etc. by civilian, scientific as well as military Director organizations



Plenary Session-II: *Advances in Space & atmospheric science Research*

Dr. K. G. Ramesh (former DGM, IMD) initiated the session with a talk on the *Use of space technology in improving the prediction of weather, climate, and extreme events.*



Dr. Prakash Chauhan (Director, IIRS) delivered the next talk on *Unravelling the mysteries of Moon from the Indian Lunar Mission*” focusing on the important findings of the Chandrayaan-1 mission and the identification of

hydrological cycle in the form of crystal water in the moon's rock lattice

Vikram Sarabhai Memorial Lecture

Padmasree Kiran Karnik delivered the Vikram Sarabhai Memorial Lecture on “Technology for People’s Good: Vikram Sarabhai’s Enduring Legacy” touching upon ISRO’s scientific activities for the betterment of India over the years driven by the economic viability and feasibility of their technology.



ISG Millennium Lecture

Prof. Henry Lamin (Pro-Vice Chancellor, NEHU) delivered the other talk on “Development of North East India: Issues and Challenges” wherein he touched upon many diverse issues pertaining to the development of North East India

Cultural Programme

The inaugural and plenary sessions of the first day were concluded by a lively cultural program in the evening, depicting the rich and diverse culture of North East India. The audience was enthralled with several dance forms representing Manipur, Assam, Mizoram and Tripura.



Cultural Programmes showcasing the culture of Manipur and Tripura States



Cultural Programmes showcasing the culture of Assam and Mizoram States

Exhibition by Sponsors

To give an opportunity the scope to influence, create awareness about the institutions/company's profile through strong brand visibility, an exhibition was organized during the symposium. Alfa Technologies Pvt. Ltd., North Eastern Space Applications Centre (NESAC), Cineworth Sales and Services Pvt. Ltd. North East Centre For Technology Application And Reach (NECTAR), Indian National Remote Sensing Centre (NRSC), Institute of Remote Sensing (IIRS), Mohalanobis National Crop Forecast Centre (MNCFC), Kambill Systems Pvt. Ltd., M.P. Council of Science & Technology, Mizoram Remote Sensing Application Centre displayed their products and services in the exhibition. Shri Tapan Misra, President, ISG and ISRS inaugurated the exhibition at NESAC Outreach premises on Nov 21, 2019.



Inauguration of Exhibition Stalls by Shri Tapan Mishra, President ISG and ISRS



Visitors at the Exhibition area

Technical Sessions

There were 18 technical sessions spread into different themes including one Poster session. Posters from different themes were displayed in the Poster presentation area, where visitors went through the posters and interacted with the authors.



Inauguration of Poster Session by President, ISG & ISRS and the visitors at the poster presentation area

Advances and Innovations in Image Processing

The Theme '*Advances and Innovations in Image Processing*' hosted 19 papers divided across two sessions, the sessions were chaired by Dr D. Dhar, SAC and Dr R. D. Garg, IIT Roorkee and Co-chaired by Dr Anil Sood, PRSC and Dr Prasun Kumar Gupta, IIRS. Dr D. Dhar, Chair of the session presented a lead talk on Computer vision and its applications, Dr Prasun K. Gupta, Co-chair of first session also presented the lead talk on the topic "Impact of street light and vehicular traffic on night time lights". The session was mainly focused on recent advances and innovations in Image processing. Papers presented in this theme were addressing varied areas from automated change detection, object based classification advanced classifiers and image preprocessing techniques etc.



Forestry, Environment & Ecosystem Management

The theme on '*Forestry, Environment & Ecosystem Management*' was Chaired by Dr Hitendra Padalia, IIRS and co-chaired by Dr Nikhil Lele, SAC. Dr Lele also presented a lead talk on forest GPP estimation for NER using Indian satellites. The papers presented in this session addressed areas such as mapping of above ground biomass as well as deriving phonological metrics and vegetation health monitoring using advanced classifiers on hyperspectral data etc.



Geospatial Technology on Governance and Societal Applications

The session on '*Geospatial technology on governance and societal applications*', which was Chaired by Dr P. P. Nageswara Rao, Former Director, NESAC and Co-Chaired by Dr S. A. Khan, RMRC, ICMR. Dr Khan presented the lead talk addressing the issues of JE cases in Assam. The session concluded with 8 presentations addressing issues such as application on Geoinformatics for governance applications, selection of best suitable sites for establishment of new health centres, mining condition assessment, crime monitoring etc.



Large Scale Mapping, Urban and Infrastructure Planning and Development

The session on “Large-scale mapping, Urban and Infrastructure Planning and Development” was chaired by Prof. Anjana Vyas, CEPT University and co-chaired by Dr. Jenita Mary Nongkynrih, NESAC. The session started with a lead talk by Prof. Anjana Vyas, where she talked about the use of UAV, IoT, and AI algorithm for large scale mapping for urban planning. The presentations in the session include studies like estimation of current and future urban expansion of various cities in India, mapping and monitoring of urban flooding, desertification etc. There were a total of 4 student’s presentations too. The second part of the



same session was chaired by Prof. B. S. Mipun, NEHU and co-chaired by Dr. P. K. Rynnga, NEHU. The session was commenced with a talk by Prof. B. S. Mipun on the use of high-resolution earth observation data for urban and infrastructure planning. This session saw seven presentations on topics ranging from the use of hyperspectral data for large scale urban mapping to the use of geo-informatics for establishment of telecom infrastructure. A total of three students presented in this session.

Remote Sensing for Agriculture, Soil, and Allied Areas

The session titled “Remote Sensing for Agriculture, Soil, and Allied areas” was chaired by Dr. J. S. Parihar, Former DD, SAC and co-chaired by Dr. M. M. Kimothi, Consultant, MNCFC. Dr. J. S. Parihar gave the lead-talk of this session on “Geomatics applications in agriculture: Achievement and Challenges” where he urged the scientific community to use new advanced technologies in agriculture. This session saw presentations by many distinguished personalities including Dr. M. M. Kimothi, Dr. P P Nageswara Rao, and Dr. Narendra N Das, JPL, NASA. The session saw many interesting talks ranging from the use of satellite remote sensing for site suitability of horticulture crops to monitoring of cotton crops. The session also saw a lively discussion at the end and the need for precision agriculture was emphasized. A total of 13 presentations were there in this session, out of which two were of students presentation.



Current Scenario in Weather and Climate Change Studies

The session titled “Current Scenario in Weather and Climate Change Studies” was chaired by Prof. B.N. Goswami, Cotton University and co-chaired by Dr. S.S. Kundu, NESAC. The session commenced with a lead talk by Prof. B. N. Goswami on the topic “Climate Emergency: Indian Monsoon Perspective”. He talked about the various aspects of the science of climate change and the trend of increase of extreme events over India. The session saw presentations from both climate and weather perspectives. There were presentations on WRF-CHEM (atmospheric chemistry modeling), WRF-HYDRO (runoff modeling), and WRF-DA (Data assimilation of satellite radiance). A total of four student presentations were there in this session.



Geospatial Technology for Water Resource Management

The session on 'Geospatial Technology for Water Resource Management' was divided into 2 sub-sessions. The first was chaired by Prof P.K. Bora from the Central Agricultural University and co-chaired by Shri Ranjit Das from NESAC. Seven papers were presented in this session including the lead talk on Framework to Estimate Green Water at a regional scale. The other session was chaired by Dr S.P.



Aggrawal from Indian Institute of Remote Sensing and co-chaired by Dr Diganta Barman from NESAC. The session had 9 technical presentations including the lead talk by Dr S.P. Aggrawal which briefly touched upon all aspects of geospatial technology in water resource management, water level studies with altimetry, snow melt runoff modeling, flood inundation studies and glacier studies.

Over the two sessions, all aspects of water resource management such as ground water quality assessment, ground water recharge mechanisms, freshwater identification, bank line migration studies, flood early warning systems and flash flood warning systems, waterlogging and glacier dynamics were covered.



Special Session of ISPRS Technical Commission V on Capacity Building



A special session on ISPRS TC-V on Capacity Building and Outreach was conducted during second day of the symposium. The session was chaired by Dr A. Senthil Kumar, Director, CSSTEAP, Dehradun and co-chaired by Dr Anjana Vyas from CEPT University. The session had 3 oral presentations which were concerned with different aspects of information dissemination covering aspects of UDP protocols to be used and outreach activities to the rural parts of the country. This was preceded by a panel discussion by invited speakers Dr A. Senthil Kumar, Dr

S.K. Srivastava, Shri P.L.N. Raju, Prof Sunil De, Dr Anjana Vyas and Dr Subashisa Dutta. Dr Senthil Kumar laid the framework for the talk by elaborating on transforming lives through education in geospatial technology and the present efforts by ISPRS and other organizations such as CSSTEAP. Dr S.K. Srivastava and Shri P.L.N. Raju briefly summarized efforts taken up by IIRS and NESAC respectively in promoting space literacy across the country through efforts ranging from providing materials for class 11th and 12th students, conducting Young scientist programs, school and college visits, in house trainings, online live and interactive lectures, e-learning programs for short and long duration and internship opportunities. Shri Raju highlighted about the upcoming training for BIMSTEC countries to be conducted by NESAC during January, 2020.

Advancements in Photogrammetry, UAV and LiDAR Applications

The session on 'Advancements in Photogrammetry, UAV and LiDAR Applications' was Chaired and Co-Chaired by Shri Jayaprasad P from the SAC, Ahmadabad and Shri Victor Saikhom from NESAC

respectively. The session consisted of 8 talks including the lead talk. The first talk was the lead talk by the Chair of the session Shri Jayaprasad P. This talk summarized the state of the art technologies in photogrammetry and related aspects of 3D studies. The presentations were made on diverse aspects of 3D studies, UAV borne sensors and issues of data acquisition and processing, multispectral and hyperspectral cameras as well as UAV-SAR data. There were presentations on 3D technology and its use in landfill studies, construction site monitoring, heritage site restoration, watershed analysis etc. The presentations on innovations in feature reduction for hyperspectral data and decomposition techniques for L band SAR data were also covered during the session.



Geospatial Technology for Renewable Energy Resources and Geosciences Applications

The session on 'Geospatial Technology for Renewable Energy Resources and Geosciences Applications' was chaired by Prof. Devesh Walia, NEHU. The lead talk of this session by the Session Chair emphasized the growing need for energy and mineral resources and its importance for nation building. The talk detailed upon the availability of mineral deposits and efforts our efforts to harness renewable energy. He also elaborated on how the geospatial technology can help in identification of potential sites, estimate parameters to narrow down locations of exploration sites through mapping, measuring and modeling. A



summarization of different sensors such as multispectral, hyperspectral, thermal, SODAR (Sonic Detection and Ranging), LiDAR, HELIOSAT etc were briefed upon. The technical presentations were 12 papers were presented in this Session. The presentations provided an apt overview of all aspects of renewable energy studies, energy budget studies and geosciences including mapping of iron oxides on the lunar maria, earthquake precursor studies, landslide susceptibility mapping, uranium mineralization and tectonic deformation studies etc.

Web and Location Based Services

The session on 'Web and Location Based services' was chaired by Dr Sameer Saran from IIRS who presented his opening remarks on the dissemination of data through geoportals and gave an overview of specific services provided by ISRO. Overall, the session consisted of 7 technical presentations including the lead talk by Co-chair Ms Sweta Mishra, SAC, who delivered a talk on development of a webGIS based platform for hydrological services and deployment over the VEDAS portal of SAC. The technical presentations in this session covered a variety of topics starting with location based services and improvement of accuracy of GPS signals for urban areas, data access frameworks, development of GIS based platforms, mobile apps and full-fledged operational web portals. The range of application and use cases include hydrological applications, road network planning, high



resolution mapping, land degradation studies, and crop damage assessment. The session aptly covers all aspects of moving towards an open, transparent, citizen centric governance system and is highly vital for decision makers for visualization and assessment.

Big Data Analytics, Data Mining and IoT

The Session on 'Big Data Analytics, Data Mining and IoT' was chaired by Shri Shashikant A. Sharma, SAC and Co-chaired by Dr. Dibyajyoti, NESAC. Shri Sharma presented the lead talk where he demonstrated the various AI and Big data tools and techniques which are deployed on the web and is available for use by public. 11 papers were presented in the session addressing the applications of AI and big data in forestry, flood mapping, crop delineation etc. Many innovative techniques were also demonstrated showcasing semantic embedding for classification of satellite images as well as road quality monitoring, water level monitoring, etc.



Hyperspectral Remote Sensing - Advancements and Applications

The session on 'Hyperspectral Remote Sensing- Advancements and applications' was chaired by Dr Ajit Tyagi, Former Director General, IMD and Co-Chaired by Dr Rishikesh Bharti, Asst. Prof IIT-Guwahati. Lead talk of the session was presented by Dr Manoj addressing on the topic of estimating foliar Nitrogen using hyperspectral vegetation indices. The papers presented in the session addressed areas of validating hyperspectral data for various platforms such as AVIRIS-NG, resolution merging of hyperspectral data with high spatial resolution of multispectral data as well as development of tools of estimating the deep absorption bands. Some of the studies also highlighted the crop characterization as well as mineral characterization.



Space Technology for Disaster Management and Mitigation

The session titled "Space Technology for Disaster Management and Mitigation" was chaired by Dr. J.S. Parihar, Former Deputy Director, SAC and Co-chaired by Prof. Y.S. Rao, CSRE, IIT Bobbay. The session commenced with a lead talk by Prof. Y.S. Rao on "Automatic thresholding based flood mapping with temporal Sentinel-1 images". Including the lead talk there were 7 presentations in this session, out of which four were student presentations. This session saw presentations that touched both on the observation based monitoring and modeling based monitoring and prediction of disaster. The topics touched upon various disasters ranging from floods to heat waves to crop damage assessment.



Microwave Remote Sensing - Challenges and Applications

The session titled “Microwave remote sensing - challenges and applications” was chaired by Dr. J.S. Parihar and co-chaired by Shri Shashi Kumar, IIRS. The lead talk of this session was given by Shri. Shashi Kumar on “PolInSAR inversion modeling for forest height retrieval”. The session had a total of 10 presentations out of which six were student presentations. The session saw some interesting and diverse utilizations of SAR from estimation of flood inundation to crop estimation to ground deformation. A couple of papers also touched upon the validity of using cross polarization (VH) instead of VV polarization for crop estimation and flood inundation.



Special Session on Jal Shakti – Sustainable Water Resources Management in India

A special Session on ‘Jal Shakti – Sustainable Water Resources Management in India’ was organized on the 3rd day of the symposium. The Session was chaired by Dr. V.V. Rao, NRSC, Hyderabad. There were a total of four technical presentations made as a part highlighting the activities of the Jal Shakti ministry that dealt with different aspects starting from the Namami Gange programme to the adoption of cloud based AI/Machine Learning approaches by the IWRIS. The presentation on “Geospatial Technology in Rejuvenation of the Ganga Basin” made by Shri DP Mathuria, ED (Tech), NMCG, Ministry of Jal Shakti. Shri Piyush Gupta made a presentation on the *Namami Gange Programme*, which was launched in May 2015 as an integrated effort to ensure effective abatement of pollution and conservation of river Ganga by adopting a comprehensive river basin approach.

The presentation on ‘National Hydrology Project – Paradigm Shift in Water Management’ was made by Dr. K.J. Anandha Kumar emphasizing the need of NHP along with other aspects such as data collection and management, real time data acquisition and web based data management, flood forecasting system etc. The presentation on ‘Space Technology in Harnessing Water Resources Potential in India’ was made by Dr. V.V. Rao, NRSC and dwelt at length on the different water resources in various parts of India along with the issues such as access to clean water, importance of water resources in economic growth, rapid depletion of ground water tables, frequent floods and basin management.



The last presentation in Session was on ‘Water informatics - a way forward’ made by Shri Mayank Singh Chetan, Deputy Director, NWIC. He dealt with the formation of the National Water Informatics Centre, its objectives, mission and vision. He also highlighted the existing IWRIS system capabilities and how they could be enhanced by a movement towards a cloud driven decision support system.

After the special session on Jal Shakti, the concluding session/panel discussion started with the following panel members:

- The discussions started with opening remarks by Shri P.L.N. Raju, Director, NESAC wherein he mentioned how sustainable development is not an easy task and how space technology can help solve problems like Jhum cultivation which takes a heavy toll on the land, groundwater table depletion which necessitates judicious use of water resources and also how innovations like working from home, drone usage etc. can help address some important problems. He also mentioned about the importance of policy making with regards to geospatial tools and technologies.



Dr. Raj Kumar began the panel discussions and he mentioned about the primary objective of the symposium being the participation of researchers and students and how the goals of sustainable development could be achieved by fostering an open data policy. He stressed on the importance of sharing data with the public and strongly emphasized the capabilities of students being able to do wonders with such a provision as regards new innovative research. He concluded by adding that the Jalshakti initiatives should be given more focus with symposiums like the current one being a way of inviting contributions from the participants.

Dr. J.S. Parihar. Highlighted how the 7th schedule of the Indian constitution recognizes agricultural states with them having a lot of flexibility to take up important tasks. He stressed the role of remote sensing and GIS technology in making statistical estimates more reliable and how it had been achieved to quite an extent in the past few years. He added that the NE region was prone to disasters and other vulnerabilities and that space technology could provide solutions to some of the problems. One of the crucial points he made was the issue of unsettled farmer claims under the Fasal Bima Yojana and that UAVs could prove useful in this regard while acknowledging the fact that operational restrictions of UAVs and drones made the task difficult. Dr. Parihar also called upon to utilize block chain technology as a means of accountability in today's world. He highlighted the importance of infrastructure development using geospatial tools and being driven by the 3 Ms – Mapping, Modelling, Monitoring and how NESAC could play a vital role in this regard in leading the region with clean and green solutions.

Dr. V.V .Rao who praised the standard and quality of papers presented during different technical sessions of the symposium. He expressed concern about the amount of research undertaken on the water resources since it was very less compared to other fields while adding that the non availability of water resource data in the public domain and unwillingness of related organizations to share the data with foreign research groups were the two main reasons behind this. He mentioned that with a lot of effort the IWRS platform had now taken some shape but field data was still needed for validation as far as any satellite data based research was concerned. He added that NE region had an abundance of water bodies yet still suffered from drinking water problems and floods caused by heavy siltation of river beds. He concluded by adding that the NHP is trying to address some of these problems with the NE states also participating proactively in the past few years signalling a change in the mindset of governance at the ground level and the top.

Dr. P.P. Nageswara Rao who congratulated the organizers for their hard work in conducting the symposium smoothly. He mentioned how the NE region's ecosystem was both rich and fragile with the recent floods and subsequent droughts being an indicator of the same. He mentioned about the three critical factors on which new projects or implementations in the NE region should depend – bear ability (impact on the people, ecosystem and environmental damage), viability (high cost-benefit ratio expected) and equity (benefits people from all sectors of the society). The example of crop insurance programme was made which could reduce the pains of the farmer. Additionally precision farming techniques are the need of the day as they reduce environmental degradation and this could be achieved with space technology driven tools. He also call upon the urgent need and importance of e-Governance using data analytics with geospatial technology at different levels of all departments of the government and offered examples about satellite based site suitability analysis regarding the construction of school toilets and health centres in different regions.

Prof. B.S. Mipun offered his comments from an academic perspective and mentioned that the latest high resolution satellite data was largely inaccessible by the academic community due to either being too costly or unavailable altogether to the public. This results in a stagnation in academic research as students are

forced to work with older, low quality, freely available data such as LISS-3 or Landsat data. He opined that students had great capability to contribute to the decision making process but were getting hindered by the inaccessibility of data. He hoped that this would change soon enough and called upon the panel members to take this angle into consideration.

After this, the moderator of the session Shri PLN Raju, called upon opinions from the participants and audience present. A lot of thought provoking points were made by the audience. These include:

- Importance to be given to bamboo cultivation
- Use of geospatial technologies to contribute to the economic growth of farmers by performing site suitability analysis for high value aromatic crops
- Bridging of gap between local people and technology by involvement and feedback of people in the decision making process
- An increase in the focus on NE region assets
- Exclusive use of geospatial technology for infrastructure development and the importance of this being able to address long term sustainability
- Inclusion of schools and colleges as regards geospatial knowledge development
- Socio-economic development of the NE region as an ecotourism hub using geospatial technology etc.

Shri Shashikant A. Sharma, Secretary ISG briefly summarized the ISG resolutions and recommendations (attached separately with the Summary report).

At the end of the Panel discussions, felicitation of the tutorial coordinators was made followed by a felicitation of the exhibitors. This was followed by distributed of awards for best performance in both oral presentations and poster presentation categories. As such there were four categories: Oral presentations (general), Oral presentations (students), Poster presentations (general) and Poster presentations (students).

The programme ended with a vote of thanks offered by Dr. Bijoy K. Handique Organising Secretary of the symposium.

The Symposium news in the Media

- <https://www.sentinelassam.com/north-east-india-news/meghalaya-news/governor-tathagata-roy-emphasized-on-use-of-geospatial-technology/>
- <https://meghalayatimes.info/national-symposium-on-innovations-in-geospatial-technology-on-nov-20-22/>
- <https://theshillongtimes.com/2019/11/21/innovations-in-technology-need-to-address-issues-in-ne-says-guv/>



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ISG-ISRS NS 2019

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